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This code focuses on the change in length a metal bar goes through when a weight is attached to the bottom of the bar. The addition of the weight creates stress which equals force over area. The stress value is then used to solve for the elastic region which equals stress over ‘E’. In this instance, ‘E’ is from the Young’s modulus of low density polyethylene and equals 0.2GPa. Finally, taking the calculated elastic region times the length of the bar will result in the change in length of the bar.

This code was created so that the elements of solving for change in length of metal due to additional weight could be manipulated. These elements include the length of the bar, the diameter of the bar and the weight added to the bar. The code also includes radio buttons that give the option of weight in kilograms, pounds, and grams so that the person using the code does not personally have to convert their chosen mass to the uniform kilogram. There were also radio buttons included for the diameter of the pipe and the length of the pipe where users can choose centimeters, meters, or inches. By being able to personalize the dimensions dealing with the change in length, the code allows anyone to easily use and customize the function in order to see the change of the metal bar with their numbers.

Originally, the code was meant to plot the change in length to visually see the correlation between weight and the change in length. However, after getting approval on the project from Quinn, the code was changed so that it was no longer a plotted graph, but rather several edit text boxes and radio buttons, allowing for users to customize the code to their convenience. The design of the code first began with an outline of the figure displayed, deciding where to put the text boxes and buttons. After the figure was created, a button group was also created where radio buttons were added in. There was some difficulty with creating the radio buttons and ensuring they were converted correctly in between the different units. Originally, only the weight was going to have radio buttons, but there was eventually radio buttons for diameter and length of the bar added. All these customizations were made so that the code would be very user-friendly by eliminating time-consuming conversions.

While writing this code, we encountered many problems, most of which were solved after several hours of research and comparison to old codes. Issues like assigning the radio button type to an “if” function proved challenging to figure out. When creating this code, we looked for guidance from the example final project, but instead chose to go a different route and focus more on text edit boxes. We have never used text edit boxes with radio buttons to change the units and found office hours to be very helpful with figuring out small errors that continually came up. Once the code could be formatted for one text edit box and for one set of radio buttons, we simply adjusted the code slightly for the other text boxes and radio buttons and were able to finish the code without any major errors or issues.

GUIs are immensely helpful and beneficial when used correctly. Just like in this final project code, GUIs make running functions easily changed to fit the needs of the user, such as using radio buttons to convert units. GUIs will be very helpful in the future while dealing with chemical engineering, it can help create figures to assist with the visualization of projects which allows engineers to see their numbers not just in a data sheet. GUIs allow customization with text edit boxes which is very convenient while dealing with different units, dimensions, and situations one might encounter in engineering. Just like in this project, being able to customize the aspects of the bar is very efficient and easy to do and can help take out endless math problems by creating a GUI for that specific situation. Even little things like a scroll bar or the animation of a scroll bar can be helpful when you are given sets of data and would like to compare one set to the next. A large benefit of using GUIs is that the product is usually user-friendly, where anyone is able to customize and work on the GUI product without knowing how to actually code it, making it an easy thing to share with others and use even if they are not very familiar with it.